Prediction of Fundamental Fish Assemblages of the Mid-Atlantic Highlands

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A statistical software tool, the Stream Fish Assemblage Predictor (SFAP), based on stream sampling data collected by the EPA in the mid-Atlantic Highlands, was developed to predict potential stream fish communities using characteristics of the stream and its watershed.

Step one in the tool development was a cluster analysis that formed groups of streams with similar fish species. Twenty-three clusters, each defined by a fundamental fish assemblage, resulted. Step two was a discriminant analysis, which produced a system of equations to predict a stream's fundamental fish assemblage (its cluster) based on characteristics of that stream and its watershed (e.g., stream slope, percent forested area in the watershed, stream bank vegetation, latitude, longitude).

The discriminant equations, when tested using our sample data, correctly predicted a stream's fish assemblage with approximately 35% accuracy. The chance of randomly choosing the correct cluster would be approximately 4% (1 chance in 23). The actual stream cluster was one of the three most probable predictions in 65% of the test cases. Randomly, given three choices, one would only have a three in 23 chance of picking the correct assemblage (13%).

These predicted fish assemblages can be used to estimate stream health. This software also allows users to investigate potential impacts of environmental restoration or degradation by altering stream and watershed characteristics, then examining changes in the predicted fish community. This tool was developed specifically for stakeholders of the Canaan Valley Institute, WV, but can be implemented by all parties interested in stream fish communities of the Mid-Atlantic Highlands region.

This tool is currently available from the Canaan Valley Institute's Web site at http://www.canaanvi.org/.